WHAT IS CLAIMED IS:

1. A synchronous rectifier comprising:

a MOSFET device; and

a gate driver for driving the gate of the MOSFET device, the MOSFET device comprising first and second MOSFET transistors coupled with their drain-source paths in parallel to receive an alternating current waveform for rectification by the drain- source paths of the MOSFET transistors, the first transistor having a low Rdson and the second transistor having a high Rdson whereby the apparent Rdson of the MOSFET device is increased when the current through the MOSFET device is below a threshold thereby enabling zero crossing detection.

2. The synchronous rectifier of claim 1, wherein the gate driver comprises a Schmidt trigger having an output coupled to the gate of a MOSFET device and having its inputs coupled across the drain-source path of the MOSFET.

3. The synchronous rectifier of claim 2, wherein the Schmidt trigger comprises two Schmidt triggers, one for the first transistor having a low Rdson and a second for the second transistor having a high Rdson.

4. The synchronous rectifier of claim 2, wherein the Schmidt trigger has its inputs coupled across the drain-source voltage of the MOSFET device.

5. A synchronous rectifier comprising a power MOS device and an amplifier driving the gate of the power MOS device, the amplifier having a first input coupled to the drain or source of the power MOS device and a second input coupled to a reference voltage coupled between the second input and the other of the drain or source of the power MOS device whereby when the drain-source voltage across the

MOSFET is near the reference voltage, the amplifier maintains the drain-source voltage at the reference voltage until the gate-source voltage equals approximately zero, thereby enabling zero current detection by an offset comparator.

6. A method of driving a MOSFET as a synchronous rectifier comprising:

increasing the apparent drain to source on-resistance (Rdson) of the MOSFET when the current flowing in the drain-source path of the MOSFET is below a threshold level, thereby enabling zero crossing detection.

7. The method of claim 6, further comprising providing two MOSFETS with their drain-source paths in parallel, one MOSFET having a high Rdson and the second having a low Rdson.

8. The method of claim 7, further comprising sensing the voltage across the drain-source path of the MOSFET and switching on the MOSFET with the high Rdson first and as the current increases above an on-threshold level, switching on the MOSFET with the low Rdson.

9. The method of claim 8, further comprising switching the MOSFET with low Rdson off as the current decreases below an off-threshold level and thereafter switching the MOSFET with high Rdson off as the current further decreases.

10. The method of claim 9, wherein the on-threshold and off-threshold levels are different.

11. The method of claim 6, wherein the apparent drain-source on-resistance is increased at a current level below the threshold level by providing an offset voltage to maintain the drain-source voltage substantially constant until the gate-source voltage is approximately zero.

12. A method for driving a power MOSFET as a synchronous rectifier comprising:

coupling first and second MOSFET devices with their drain-source paths in parallel to receive an alternating current waveform for rectification by the drain-source paths, the first MOSFET having a low Rdson and the second MOSFET having a high Rdson whereby the apparent Rdson of the two MOSFETs in parallel is increased when the current through the MOSFET is below a threshold thereby enabling zero crossing detection.

13. The method of claim 12 further comprising coupling the inputs of a Schmidt trigger having an output coupled to the gate of the MOSFET and sensing the drain-source voltage across the MOSFET to determine when to switch the first and second MOSFETs on and off.

14. The method of claim 13, comprising providing two Schmidt triggers, one for the first MOSFET having a low Rdson and a second for the second MOSFET having a high Rdson.

15. A method for driving a synchronous rectifier comprising a power MOS device comprising providing an amplifier driving the gate of the power MOS device, the amplifier having a first input coupled to the drain or source of the power MOS device and a second input coupled to a reference voltage coupled between the

second input and the other of the drain or source of the power MOS device and, when the drain-source voltage across the MOSFET is near the reference voltage, maintaining the drain-source voltage at the reference voltage until the gate-source voltage equals approximately zero, thereby enabling zero current detection by an offset comparator.

16. A synchronous rectifier, comprising:

a MOSFET device for providing a rectifying operation;

a feedback signal coupled to at least one of a drain and a source of the MOSFET device;

a control circuit coupled to the feedback signal and operable to provide a gate control signal;

the gate control signal being applied to a gate of the MOSFET device and operable to maintain the rectifying operation; and

a reference voltage coupled to the control circuit for contributing to a closed loop control whereby the MOSFET device emulates an ideal diode.

17. The synchronous rectifier according to claim 16, wherein the control circuit and the reference voltage are incorporated into a common component with the MOSFET device.

18. A method for controlling a MOSFET Vds voltage, comprising:

obtaining a voltage reference for contributing to a control signal provided to a MOSFET;

operating a closed loop control in conjunction with the voltage reference to provide the control signal to the MOSFET;

providing a feedback to the closed loop control based on a MOSFET parameter, whereby the Vds voltage of the MOSFET is controlled to emulate an ideal diode.

19. The method according to claim 18, further comprising providing a linear gain in the closed loop control.

20. The method according to claim 18, further comprising reducing a MOSFET sensitivity related to variations in Vds voltage thresholds.